increased BMD at the BML location. Increased BMD associated with BML may be an indicator of locally increased loading within the knee joint or a consequence of trabecular microfractures (impaction and callus formation), although the cause-effect relationship was not investigated. However, in our study, the BML extension was not exactly covered by the a priori (in the CT image) defined analysis VOIs. Nevertheless, these results are a promising step in utilizing multimodality imaging and advanced 3D analysis for the diagnosis of knee OA by combining the benefits of CT and MR.

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FINGER LENGTH RATIOS AND INCIDENT KNEE OSTEOARTHRITIS: DATA FROM THE OSTEOARTHRITIS INITIATIVE

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Purpose: Previous studies have shown that second digit:fourth digit (2D:4D) finger length ratios, viewed as an indicator of exposure to sex hormones during fetal development, have been associated with knee osteoarthritis (OA). However, these studies used visual classification of finger length ratios or measurements of finger length that included the joint space. Measurements that include the joint space may be influenced by reverse causation due to the impact of joint space narrowing. This study used a novel method to measure hand bone lengths, excluding the joint space, to differentiate individuals that develop incident knee OA and those who don't among participants in the Osteoarthritis Initiative (OAI).

Methods: Participants of the OAI were included in this case-controlled study if they had knee radiographs at the baseline and 48-month visit as well as quantitative and semi-quantitative radiographic knee readings (as of October 2011). Cases were defined as individuals with an incident knee osteophyte (baseline OARSI osteophyte score < 2 and 48-month OARSI osteophyte score ≥ 2). Controls were individuals with no incident knee osteophyte (baseline and 48-month OARSI osteophyte scores < 2). If a participant had a case and control knee, the control knee was excluded. If the participant had two case knees or two control knees, the right knee was selected. 276 knee-, cohort-, age-, gender-, and body mass index-matched participants met this criteria. Two readers used a semi-automated, custom software to delineate the joint margins of the metacarpophalangeal (MCP), proximal interphalangeal (PIP), and distal interphalangeal (DIP) joints (inter-tester ICC [2,1 model] = 0.82 to 0.92) on the dominant hand. One reader (intra-tester ICCs [3,1 model] > 0.99) marked the midpoint of the base of the metacarpals and midpoint of the distal apex of the distal phalanges. The software generated bisecting lines to measure the lengths of the metacarpals and phalanges of the second and fourth digits (See Figure). The overall 2D:4D ratio was calculated as the second digit length (phalanges + metacarpals) divided by the fourth digit length (phalanges + metacarpals). Secondary analyses evaluated the bones that were included in the overall 2D:4D ratio: finger length 2D:4D ratio (proximal, middle, distal phalanges), distal phalanx 2D:4D, middle phalanx 2D:4D, proximal phalanx 2D:4D, and metacarpal 2D:4D. Paired-sample t-tests were used to compare the overall 2D:4D ratio and the five secondary ratios between cases and controls. An independent sample t-test assessed differences in overall 2D:4D ratio between males and females. Statistical significance was defined as $p < 0.05$.

Results: Of the 276 participants, 110 matched case-control pairs had readable hand radiographs. Case participants were 62.6 ± 8.4 years of age, had a body mass index of 29.5 ±5. 0 kg/m^2, and 7 were left handed (6%). Control participants were 62.5 ± 8.7 years of age, had a body mass index of 29.7 ± 4.1 kg/m^2, and 4 were left handed (4%). Both groups were 70% female, included 58 (53%) right knees and 57 (52%) participants from the Incidence cohort. Females had a greater overall 2D:4D ratio compared to males ($p = 0.01$). Overall 2D:4D ratio was not significantly different between cases and controls. All other ratio measurements yielded similar results (See Table).

Conclusion: When using bone length measurements that did not include the joint space we found no significant differences in 2D:4D ratios between individuals with incident knee OA and those without knee OA.

Paired Sample T-tests Comparing Finger Length Ratios Between Cases and Controls

Overall 2D:4D Ratio	Cases (n = 110)	Controls (n = 110)	p value
Overall 2D:4D Ratio	1.015 ± 0.021	1.017 ± 0.021	0.311
Distal Phalanx 2D:4D Ratio	0.918 ± 0.055	0.921 ± 0.047	0.699
Middle Phalanx 2D:4D Ratio	0.861 ± 0.042	0.867 ± 0.037	0.177
Proximal Phalanx 2D:4D Ratio	0.947 ± 0.025	0.952 ± 0.030	0.140
Metacarpal 2D:4D Ratio	1.160 ± 0.031	1.160 ± 0.033	0.960
Finger 2D:4D Ratio	0.914 ± 0.027	0.919 ± 0.027	0.136